UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/035,444 | 01/04/2002 | Fumikazu Yamaki | 011796 | 3015 |

23850 7590 08/14/2002

ARMSTRONG,WESTERMAN & HATTORI, LLP
1725 K STREET, NW.
SUITE 1000
WASHINGTON, DC 20006

| EXAMINER |
|---|
| TRAN, TAN N |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2826 | 3 |

DATE MAILED: 08/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/035,444 | YAMAKI ET AL. | |
| | Examiner | Art Unit | |
| | TAN N TRAN | 2826 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10 and 11* is/are rejected.

7)☒ Claim(s) *9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

*DETAILED ACTION*

**Oath/Declaration**

1. The oath/declaration filed on 01/04/02 is acceptable.

**Information Disclosure Statement**

2. If applicant is aware of any relevant prior art, he/she requested to cite it on form PTO-1449 in accordance with the guidelines set forth in M.P.E.P. 609.

**Claim Rejections - 35 USC § 102**

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Nitta (5,798,537).

With regard to claim 1, Nitta discloses a semiconductor device comprising a compound semiconductor substrate 100 having a resistivity less than $1.0 \times 10^8$ Ohm-cm at least at surface thereof, a buffer layer 101 formed on the compound semiconductor substrate 100 and having a supper lattice structure; and an active layer 103 formed on the buffer layer 101 and having an active element 204(205) formed therein. (Note lines 26-28, column 5, figs. 1, 2 of Nitta).

With regard to claim 2, Nitta discloses the semiconductor substrate 100 has resistivity less than $0.6 \times 10^8$ Ohm-cm. (Note lines 26-28, column 5, figs. 1, 2 of Nitta).

With regard to claim 4, Nitta discloses an electrode 106 formed on another surface of the compound semiconductor substrate 100. (Note fig. 2 of Nitta).

With regard to claim 5, Nitta discloses the electrode layer 106 is not electrically connected to the semiconductor device. (Note fig. 2 of Nitta).

With regard to claim 6, it is inherent that the electrode layer 106 is connected to one power supply potential of the semiconductor device in order to increase light emitting area. (Note fig. 2 of Nitta).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 10, 11 are rejected under 35 U.S.C. 103(a) as being anticipated by Nitta (5,798,537).

With regard to claim 3, Nitta discloses all the claimed subject matter except for the active layer 103 is formed at a position within 5.0 micrometer from the surface of the compound semiconductor substrate 100. However, it would have been obvious to one of ordinary skill in the art to form the active layer is formed at a position within 5.0 micrometer from the surface of the compound semiconductor substrate in order to maintain the lattice matching between the semiconductors and the sapphire substrate, because such structure is conventional in the art for

forming blue light emitting device. (Note fig. 2 of Nitta) is cited to support for the well know position.

With regard to claim 10, Nitta discloses all the claimed subject matter except for the compound semiconductor substrate has a resistivity more than $1.0 \times 10^8$ Ohm-cm in total . However, it would have been obvious to one of ordinary skill in the art to form the compound semiconductor substrate has a resistivity more than $1.0 \times 10^8$ Ohm-cm in total, in order to provide a blue light emitting device capable of adjusting wavelength freely without reducing intensity of the light to be generated, because such structure is conventional in the art for forming blue light emitting device (Note lines 26-28, column 5, figs. 1, 2 of Nitta) is cited to support for the well know position.

With regard to claim 11, Nitta. discloses all the claimed subject matter except for the compound semiconductor substrate comprising a compound semiconductor support substrate having a resistivity more than $1.0 \times 10^8$ Ohm-cm and a compound semiconductor having a resistivity less than $1.0 \times 10^8$ Ohm-cm. However, it would have been obvious to one of ordinary skill in the art to form the compound semiconductor substrate comprising a compound semiconductor support substrate having a resistivity more than $1.0 \times 10^8$ Ohm-cm and a compound semiconductor having a resistivity less than $1.0 \times 10^8$ Ohm-cm, in order to provide a blue light emitting device capable of adjusting wavelength freely without reducing intensity of the light to be generated, because such structure is conventional in the art for forming blue light emitting device (Note lines 26-28, column 5, figs. 1, 2 of Nitta) is cited to support for the well know position.

Claims 7,8 are rejected under 35 U.S.C. 103(a) as being anticipated by Nitta (5,798,537) in view of Applicant's prior art.

With regard to claim 7, Nitta does not disclose a source electrode and a drain electrode formed on the active layer, separated from each other so as to establish a channel region, and a gate electrode formed above the channel region.

However, Applicant's prior art discloses a source electrode 14S and a drain electrode 14D formed on the active layer, separated from each other so as to establish a channel region 13, and a gate electrode 14G formed above the channel region.

Therefore, it would have been obvious to one of ordinary skill in the art to form the Nitta's device having a source electrode and a drain electrode formed on the active layer, separated from each other so as to establish a channel region, and a gate electrode formed above the channel region such as taught by Applicant's prior art in order to provide a blue light emitting device capable of adjusting wavelength freely without reducing intensity of the light to be generated.

With regard to claim 8, Nitta and Applicant's prior art. disclose all the claimed subject matter except for the active layer has 2 dimentional electron Gasses. However, it would have been obvious to one of ordinary skill in the art to form the active layer has 2 dimentional electron Gasses, because such structure is conventional in the art for forming a blue light emitting device.

*Allowable Subject Matter*

5. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 9 is allowable over the prior art of record, because none of these references disclose or can be combined to yield the claimed invention such as active layer comprises a collector layer of a first conducting type; a base layer of a second conducting type formed on the collector layer; an emitter layer of the first conducting type formed on the base layer.

**Conclusion**

6. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tan Tran whose telephone number is (703) 305-3362. The examiner can normally be reached on M-F 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for after final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TT

August 2002

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800